

CLAIMS:

1. An encoder comprising a scale and a scale reader;
the scale having a plurality of reference marks
5 spaced apart in the lengthways direction;
the scale reader including a sensor which reads
the reference marks;
characterised in that:
the reference marks are arranged along the scale
10 in a random or pseudo-random pattern;
as the scale reader moves over the pattern of the
reference marks, the pattern is continually compared
with a previously stored pattern; and
when the pattern of the reference marks matches
15 the previously stored pattern, a reference signal is
output.
2. An encoder comprising a scale and a scale reader;
the scale having a series of incremental marks
20 extending along its length, and a plurality of
reference marks spaced apart in the lengthways
direction;
the scale reader including one or more sensors
which read the incremental marks and produce an output
25 therefrom, and which read the reference marks;
characterised in that:
the reference marks are arranged along the scale
in a random or pseudo-random pattern;
as the scale reader moves over the pattern of the
30 reference marks, the pattern is continually compared
with a previously stored pattern; and
when the pattern of the reference marks matches
the previously stored pattern, a reference signal is
output.

3. An encoder according to claim 1 or claim 2,
including a counter which indicates the position of the
readhead along the scale, said reference signal being
connected to an input of the counter to reset the
5 counter to a preset value.
4. An encoder according to any one of the preceding
claims, including a shift register, wherein values
representing the pattern of the reference marks are
10 read into the shift register as the scale reader passes
over the reference marks, and the pattern in the shift
register is compared to the previously stored pattern.
5. An encoder according to claim 4, wherein said
15 values are introduced into one end of the shift
register, and shifted along the shift register
synchronously with the passing of the scale reader over
the reference marks.
- 20 6. An encoder according to claim 4 or claim 5,
wherein said values may be introduced into either end
of the shift register, depending upon the direction of
travel of the scale reader along the scale.
- 25 7. An encoder according to any one of the preceding
claims, including a memory for holding said previously
stored pattern, and a comparator which compares the
pattern of the reference marks from the scale with the
previously stored pattern in the memory.
- 30 8. An encoder according to claim 7, including an
input to the memory for storing said stored pattern
therein, the pattern being received from the scale
reader as the scale reader passes over the reference

marks.

9. An encoder according to any one of claims 4 to 6,
including a memory for holding said previously stored
5 pattern, and a comparator which compares the pattern of
the reference marks in the shift register with the
previously stored pattern in the memory.

10. An encoder according to claim 9, including an
10 input to the memory for storing said stored pattern
therein, the pattern being received from the shift
register.

11. An encoder according to claim 10, including a
15 circuit for determining the validity of the pattern in
the shift register, and preventing said input being
stored in the memory if it is invalid.